

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the Application. No new matter has been introduced by way of the claim amendments. Current additions to the claims are noted with underlined text. Current deletions from the claims are indicated by text ~~striking through~~ or ~~[[double bracketing]]~~. The status of each claim is indicated in parenthetical expression following the claim number.

1. (Currently Amended) A method comprising ~~the steps of~~:
 - a) —dispersing carbon nanotubes in an acidic ~~solvent medium~~ to form a solution of dispersed carbon nanotubes ~~having with~~ substantially exposed sidewalls; ~~and~~
wherein the acid solvent is selected from the group consisting of a superacid and an oxoacid; and
 - b) —functionalizing the dispersed carbon nanotubes using a functionalizing agent while the dispersed carbon nanotubes are in the acid solvent;
wherein functionalizing comprises by covalently attaching functional groups to their substantially exposed sidewalls to ~~form~~ yield sidewall functionalized carbon nanotubes.
2. (Original) The method of Claim 1, wherein the carbon nanotubes are selected from the group consisting of single-wall carbon nanotubes, double-wall carbon nanotubes, multi-wall carbon nanotubes, small diameter carbon nanotubes, and combinations thereof.
3. (Currently Amended) The method of Claim 1, wherein the ~~acid medium comprises a~~ superacid is selected from the group consisting of oleum, chlorosulfonic acid, triflic acid, and combinations thereof.
4. (Currently Amended) The method of Claim 1, wherein the ~~acid medium comprises an~~ oxoacid is selected from the group consisting of H₂SO₄, H₃PO₄, HClO₄, ~~and~~ HNO₃, and combinations thereof.
5. (Currently Amended) The method of Claim 1, wherein the acid ~~solvent medium~~ comprises H₂SO₄.

6. (Currently Amended) The method of Claim 1, wherein the acid ~~solvent~~medium ~~further~~ comprises a persulfate species.
7. (Currently Amended) The method of Claim 1, wherein the ~~step of functionalizing involves a~~ functionalizing agent is selected from the group consisting of carbocations, halonium ions, metal cations, carbon radicals, halogen radicals, hetero-atom radical species, metal-based radicals, dipolarophiles, and combinations thereof.
8. (Currently Amended) The method of Claim 1, wherein the ~~step of functionalizing agent comprises~~ involves a diazonium species.
9. (Currently Amended) The method of Claim 8, wherein the diazonium species is generated *in situ* by ~~reacting~~ion of an aniline species with a nitrite species.
10. (Currently Amended) The method of Claim 8, wherein the diazonium species comprises ~~is provided as~~ a diazonium salt.
11. (Original) The method of Claim 8, wherein the diazonium species is generated from a triazene precursor.
12. (Currently Amended) The method of Claim 1, further comprising:
processing the sidewall functionalized carbon nanotubes by at least one post-processing step selected from the group consisting of diluting, filtering, washing, drying, and combinations thereof.
13. (Currently Amended) The method of Claim 1, further comprising ~~the steps of:~~
 - a) ~~isolating~~ the sidewall functionalized carbon nanotubes from the acidic ~~solvent~~medium by filtering to yield isolated sidewall functionalized carbon nanotubes; and
 - b) ~~resuspending~~ the isolated sidewall functionalized carbon nanotubes in a solvent.
14. (Original) The method of Claim 13, wherein the solvent is water.
15. (Previously Amended) The method of Claim 1, wherein the functionalized carbon nanotubes have at least about 1 functional group per every 100 carbon nanotube carbons.

16. (Currently Amended) A method comprising ~~the steps of~~:
- a) ~~—dispersing single-wall carbon nanotubes in a superacid solvent/medium to form a dispersion of single-wall carbon nanotubes;~~
 - b) ~~—adding an aniline species and a nitrite species to the dispersion to form a reaction mixture a diazonium species in the superacid solvent; and~~
 - e) ~~—reacting the single-wall carbon nanotubes with the diazonium species while dispersed in the superacid solvent the reaction mixture~~ to form functionalized single-wall carbon nanotubes.
17. (Currently Amended) The method of Claim 16, further comprising:
oxidatively purifying wherein the single-wall carbon nanotubes have been oxidatively treated prior to dispersing.
18. (Currently Amended) The method of Claim 16, wherein the single-wall carbon nanotubes are sorted by homogeneous in a property characteristic selected from the group consisting of length, diameter, chirality, and combinations thereof prior to dispersing.
19. (Currently Amended) The method of Claim 16, further comprising: ~~a step of~~
filtering the dispersion to remove any large particles.
20. (Currently Amended) The method of Claim 16, wherein the superacid solvent/medium is selected from the group consisting of oleum, chlorosulfonic acid, triflic acid, and combinations thereof.
21. (Previously Amended) The method of Claim 16, wherein the aniline species comprises sulfanilic acid.
22. (Currently Amended) The method of Claim 16, wherein the superacid solvent further comprises further comprising a step of adding a radical source to the reaction mixture.
23. (Original) The method of Claim 22, wherein the radical source is selected from the group consisting of 2,2'-azo-bis-isobutyronitrile, benzoyl peroxide, di-tert-butylperoxide, and combinations thereof.

24. (Currently Amended) The method of Claim 16, wherein ~~the step of reacting~~ comprises heating and stirring the dispersion.
25. (Currently Amended) The method of Claim 16, further comprising ~~the steps of:~~
a) ~~after reacting,~~ diluting the dispersion ~~reaction mixture~~ with water, ~~subsequent to forming functionalized single-wall carbon nanotubes,~~ to form a diluted dispersion ~~reaction product mixture~~;
b) ~~filtering the diluted dispersion reaction product mixture over a filter to isolate the functionalized single-wall carbon nanotubes; and~~
e) ~~washing the isolated functionalized single-wall carbon nanotubes with a washing solvent after filtering to obtain washed functionalized single-wall carbon nanotubes.~~
26. (Original) The method of Claim 25, wherein the washing solvent is acetone.
27. (Currently Amended) The method of Claim 25, further comprising ~~the steps of:~~
a) ~~after washing,~~ re-suspending the ~~washed~~ functionalized single-wall carbon nanotubes in water to form a [[re-]]suspension;
b) ~~filtering the [[re-]]suspension to recover the re-washed functionalized single-wall carbon nanotubes.~~
28. (Previously Amended) The method of Claim 16, wherein the functionalized single-wall carbon nanotubes have at least about 1 functional group per every 100 carbon nanotube carbons.
29. (New) The method of Claim 8, wherein the acid solvent further comprises a radical source.
30. (New) The method of Claim 1, wherein the sidewall functionalized carbon nanotubes are water soluble.
31. (New) The method of Claim 16, wherein the functionalized single-wall carbon nanotubes are water soluble.
32. (New) The method of Claim 16, wherein the functionalized single-wall carbon nanotubes are functionalized on their sidewalls.